mine. It is not supposed to be free from defects, nor do I think, as already intimated, that it is calculated, in its present form, to supersede the plough, except in fine, light, and loose medium soils. Still, where it cannot act the part of a principal, it may serve as a useful accessory. The question turns on the value of this *cycloidal movement of vertical blades or cutting prongs*. The principle is a novel one in agriculture, and may, at least, suggest an improvement in working the soil, if it be not itself one. E.

New York, Dec. 21, 1863.

On a new Method of Casting Guns Hollow. By Mr. OUBRIDGE.

From Newton's London Journal of Arts, December, 1863.

The author remarked that the subject which he proposed to consider that evening was one upon which much had been already said and written. He believed, nevertheless, that it was not exhausted; for it was a fact that, as yet, no heavy gun had been produced which answered all requirements. Brass guns had had their day, cast iron guns had been long used, were at one period almost totally condemned, but were now cropping up again, and much might be adduced in their favor. Wrought iron, in multiforms, had been employed in the manufacture of guns, each form having peculiar advantages; but the results, on the whole, were not satisfactory. Steel had also been introduced for the purpose; but in spite of its great cohesive strength, it had been found impossible hitherto to make from it good, sound, and serviceable guns of large calibre. Many practical difficulties stood in the way of its employment in this direction, although certainly some very successful efforts had been made to construct light and small pieces of ordnance of that material. Compound guns, composed of cast and wrought iron—the one encasing the other—had also been tried, with variable and uncertain effects; but as yet no absolute rule had been deduced for the guidance of those whose duty it was to manufacture heavy guns. Time, and the expenditure of much more of the public money, might effect this great desideratum; but it had not yet been achieved; and it was, therefore, the duty of practical and scientific men to endeavor to solve the problem “how best to manufacture heavy guns?” He (Mr. Oubridge) intended to contribute a few items to the mass of existing information on the subject; and he might state that such knowledge as he had to impart had been gained from his own experience and experiments in the iron foundry. It was required, in the production of large pieces of ordnance, that the material used should be made to offer the fullest possible resistance to the bursting strain to which it would eventually be exposed, and that the cohesive strength of that material should be completely maintained. Perhaps, before advancing his own views, he might be permitted to refer to the method of casting heavy guns, which had been largely practised during the unhappy contest which still raged in America. The name of Dahlgren would no doubt be familiar to his hearers in connexion with the American civil war, and the guns which

were known as "Dahlgrens" possessed some distinguishing features. They were cast hollow, the theory of their inventor being that it was desirable "to reduce the neutral axes of his gun as nearly as possible to the centre of the thickness of the metal of which it was formed." This would be clearly seen to be the case from the diagram produced. If, on the contrary, the gun were cast solid, the cohesive power of the metal would be diminished as it approached the centre. By casting the gun hollow, this deteriorating process would be lessened by the pressure of the core in the mould. Dahlgren had evidently well considered the laws of cohesion and disintegration which governed these results. He had also adopted the plan of assisting the cooling and contracting, by pouring a stream of cold air through a tube of iron inserted in the core barrel. In this he was perfectly right, for it ought to be understood that if the cooling process operated entirely from the outer portion of the casting, it was, to use a familiar illustration, like casting an iron ring upon a mandril—an operation which they all knew would be a senseless proceeding. This plan had, however, been persistently followed until the Armstrong gun was introduced. He (Mr. Oubridge) had, several years before, submitted to the Select Committee of the Board of Ordnance, a scheme for casting heavy guns hollow, but the reply of that body was, as usual in such cases, unsatisfactory. At the same period an American gentleman made some attempts to accomplish, in this country, the same thing, but without success. For his purpose six cupolas were erected near the Charlton Pier, on this side of the town of Woolwich, and the experiments there conducted were of a costly character. The theory was not the less a true one; the effect lay in its imperfect realization.

There was no doubt in his own mind that homogeneity would be obtained to a far higher degree in large iron castings if they were made hollow in place of being solid. He had had an opportunity a few months back, indeed, of practically demonstrating the fact. A large hydraulic cylinder, requiring 17 tons of metal to cast it, had to be produced. It was to have a very small hole through the bottom end, where the iron would be 15 inches thick. He saw that the intense heat would inevitably melt the core barrel long before the metal composing the cylinder ceased to be fluid. He therefore assumed it to be a favorable opportunity for putting to the test his cherished theory. The casting was to be produced in the foundry of the Messrs. Simpson, at Pimlico, and Mr. Thompson, the manager for that firm, giving his consent, he determined to cool the core by means of an internal current of cold air. The plan of operation was very simple. A perforated tube was inserted in the core barrel, and then communicated, by means of a pipe and valve, with the blast. As soon as the mould was filled with metal, the valve was opened, and the cold air forced into the tube found an outlet through the perforations, whence it impinged upon the barrel: this latter was also perforated so as to allow of the escape of gases from the interior of the core. The result was a complete success, and the cylinder was as sound and homogeneous as could be desired. The cooling process had thus gone on from the centre, instead of the

exterior of the casting. When the operation had, as he considered, lasted sufficiently long to prevent the metal remaining in a fluid state, he caused the blast valve to be shut, and in half an hour the core barrel was found to have melted in one place, leaving an aperture three inches in diameter. The blast was then again turned on, and in less than ten minutes the barrel became black. By this method, which was of the most easy application, it was possible to reduce the temperature of the interior of a casting to almost any extent, and in a very short space of time. He desired to throw his mite into the treasury of human knowledge. It was for others to put it out, if they chose, to interest. Perhaps those who might be called upon to produce heavy castings, whether for the purposes of war, or in fulfilment of the more hallowed behests of peace, would be induced to take up the hints which he had that night ventured to give. It was to be hoped that the practical founders of England, especially, would be permitted to exercise their own judgment as to the selection of the various irons best suited for partial castings, and that in the manner of producing those castings they would not be hampered by mere theorizing or "paper engineers," of whom too many had crept into the noble profession of which he was a humble member. He had a reverence for art and science, and for its practical exemplars, but not even ordinary respect for those who pretended to be their disciples, but were nothing more than pretenders.

After the reading of Mr. Oubridge's paper, which was well illustrated by diagrams, a discussion ensued, and this was followed by a vote of thanks.

Proc. Asso. Foremen Engineers.

Decision of the Board of Examiners in Chief in the matter of the Application of J. S. MASON, for Letters Patent for Design for a Label.

Reported by H. HOWSON, Esq.

U. S. Patent Office, October 16th, 1863.

Application (A) of James S. Mason for a Patent for a Design for a Label.

On Appeal to the Examiners in Chief.

To understand the merits of this appeal requires a brief explanation of the design.

It is intended for a label to be placed on boxes of shoe-blackening, and is based upon the well-known representation of a boot so highly polished as to reflect images of the objects around it. Starting with this conception, the artist has depicted a boy holding a boot out to a dog, which is startled by the sight of his own figure in it, while the boot-black in the rear is dancing about in ecstasy at the effect. Simple as this is, two important questions grow out of the application.

In the first place, the applicant has described in his specification, and portrayed in his drawing, a duplicate design resembling the other, except that a fighting cock, irritated at the reflection of his form in the boot, is substituted for the dog. And he claims a patent which shall protect both the original design, and this modification.